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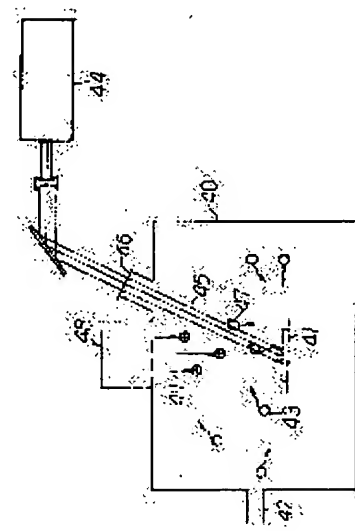
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(54) LASER BEAM ETCHING METHOD

(57)Abstract:

PURPOSE: To etch Si vertically in the cross section while preventing damages by applying ion beams simultaneously when etching Si and SiO₂ disposed in the atmosphere of fluorine or chlorine gas with radiation of excimer laser beams of XeBr, XeCl or XeF.

CONSTITUTION: A material 41 of Si and SiO₂ is disposed in a vacuum device 40 and chlorine or fluorine gas is introduced into the device 40 through a gas inlet tube 42. Under this condition, laser beams 45 from a laser 44 arranged outside the device 40 are applied onto the surface of the material 41 via a rotary reflecting mirror and a window 46. The laser 44 will be an excimer laser of XeCl or XeF when chlorine gas is used, and of XeBr when fluorine gas is used. Activated etchant 47 is produced within the device 40 to excite the electronic state of the Si on the material 41, while the SiO₂ which absorbs the beams is not etched. Ion beams 49 from an ion source 48 are simultaneously applied to the material so that the Si is etched vertically in the cross section.



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